

Earth Science

Rockhounds' NATIONAL Magazine



Working an Exposure of Shale at a Montana Fossil Insect Locality. (See "Ancient Wings in the Rocks," page 15.)

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September-October, 1955

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EDITOR'S MEMO PAD

AT THE OPENING of our new club year, a very pertinent question might well be, what are we doing for our Juniors? Or perhaps approaching the subject from a slightly different angle we might ask, what can we, or what should we be doing for them?

Has your club a department or a definite program for your youngsters, and for other people's youngsters who are not of your number, who perhaps may be just as worthy or eager to learn the facts about rocks and minerals as your own children are? If not, may we urge you to get busy at once, appoint a committee to appraise the situation, and to learn what can be done about this vital problem.

We fear altogether too few of our clubs may have taken steps in this direction. It sometimes appears as though many of our members are primarily interested in the enjoyment or benefits they get out of the meetings individually, not giving too much thought concerning what they might be able to contribute personally to the common welfare of the group or community as a whole.

We are happy to note, however, that a number of our most active clubs already have seen the light, and recognizing their responsibility have organized classes or sections for Juniors, under the direction of competent leaders from among adult club members. To sponsor such a movement with all of its time-taking work should be considered a privilege and honor. When one sees the great enthusiasm and interest often displayed by these youngsters he must feel well repaid for his efforts.

Junior Sections hold their own meetings, have their own officers, and very largely furnish their own programs. They also attend the adult meetings and occasionally contribute something very much worthwhile to the program of the Parent organization. It also should be kept in mind that Juniors have a way of soon growing up, and so become one of the best sources of new club members and leaders for the future. As older members drop out, without new blood coming in to take their places, your club will sooner or later deteriorate to the extent where disintegration sets in. For this reason alone it behooves us to cultivate our Juniors. Let's all get busy and see what can be done about it right away.

In Memoriam

Charles H. Preston was born near Puckaway Lake, Green Lake County, Wisconsin, in April, 1876. He died in Phoenix, Arizona, on June 14, 1955. Both his father and his mother were of very old New England ancestry. His mother was Elizabeth Dewey, who was a direct descendent of Governor Bradford of Plymouth Colony.

Mr. Preston attended the local grade and high school of the county of his birth and then took a complete course in business administration at the University of Wisconsin, graduating in 1906. Following graduation, he taught business subjects in high schools of Aurora, Illinois, and Oshkosh, Milwaukee and Superior, Wisconsin.

He went to Minneapolis in 1910 to accept a position on the faculty with the economics department of the University of Minnesota. He later arranged the extension division courses on business subjects, particularly accounting and business law, and for five years was in charge of the extension work in these subjects.

In 1902 he married Ruth Pierce, who was also a resident of Green Lake County, Wisconsin. Mrs. Preston preceded her husband in death in 1947. Mr. Preston is survived by two daughters, Katharine Bradway, of California, and Lucille Preston, of Phoenix, Arizona.

In 1938 Mr. Preston noticed an article in the paper authored by Mr. Edward P. Burch, founder of the Geological Society of Minnesota, announcing the organization of a group to study geology. Mr. Preston attended the meeting and ever since that time maintained a deep and abiding interest in geology.

Shortly after joining the Geological Society of Minnesota Mr. Preston was elected director and secretary of the society. He was an active member of the board from 1938 to 1951. He originated the two-week summer field trip idea for society members and he arranged, planned, and led field trips to the Grand Canyon, the Black Hills of South Dakota, Yellowstone National Park, Denver, Colorado, Estes Park, etc.

Mr. Preston was instrumental in having the Geological Society of Minnesota join the Midwest Federation in 1945. He was elected president of the Federation in 1950 and served on numerous committees from time to time. He was also active in American Federation of Mineralogical Society work. It was through his untiring efforts and enthusiasm that the Amer-

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ican Federation has made available the car emblems for members of all affiliated societies of the regional federations.

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Authors

Dr. W. B. S. Thomas, of Lyons, New York, has written a gem of a geological fairy story about lavender-tinted window glass "for our very young (and some older) readers." *Pernel Barnett*, contractor, of Orange, California, goes on fabulous field trips and in our book is on the roster of "rockhounds extraordinary." *Joe Phetteplace* and his wife *Betty Phetteplace*, from their lapidary shop at Wauzeka, Wisconsin, are too modest to write about "'Man o' War' in Mozaic" as the editor has done, but they are really the "authors." *Mrs. Stella Randolph* writes from Garrett Park, Maryland. *Henry P. Zuidema*, consulting geologist, has conducted field studies in Rocky Mountain geology for twenty years. The great interest at the Midwest Federation meeting in his exhibit of fossil insects of the Miocene epoch prompted this article. *Kenneth Parkinson*, of Hull, England, is a Fellow of the Gemmological Association (yes, that's the way our English friends spell it). *Miss Bernice Wienrank*, of Chicago, is one of our editors, but her writing, besides pleasing our readers, is so letter-perfect that our managing editor wants that mentioned here. She is by vocation a registered nurse and by avocation a devoted rockhound. Speaking of our managing editor, it is his well, but he insists that the undersigned take the responsibility for the geology. Our managing editor *Hiram L. Kennicott*, who brings a lifetime of editorial experience to the arrangement of our contributions, is a semi-retired insurance executive, who enjoys spending some of his new-found leisure working with us. (The Grove is the hundred-year old family homestead where he lives near Chicago. The tubular exhibit he mentions was prepared in 1930 by Geologist F. T. Thwaites, of the University of Wisconsin, who, if we are not mistaken, was the son of the famous Wisconsin historian and author, Reuben Gold Thwaites.)

*

Cover

This landscape in the environs of insect fossil beds shows a digging party at work in the locality. "Dawn Redwoods" and flowering meadows once surrounded lakes in this part of Montana, where today the arid foothills of the Rockies provide rich hunting for the paleontologist.

—BEN HUR WILSON, *Editor*

HUMBOLDT GEM AND MINERAL SOCIETY on October 1-2 will have its second annual fair, in the Carson Memorial Building, at Eureka, California, in the heart of the redwoods.

Exhibits will features jade from China, gold from California and cabachons made from western states material.

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GOSSAMER FALLS, here pictured in a photograph by Roger W. Price, is in a region noted for geological interest, as well as historical interest and scenic beauty. It is in Matthiessen State Park, in the canyon country of La Salle County, Illinois, formerly known as Deer Park. This is in the vicinity of Starved Rock, on the Illinois River, a region alluring to rockhounds. Close by are Bradley's Falls near Lowell and the exposure of the great La Salle anticline near Utica. Rock exposures are primarily of Ordovician age.

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"The Washer", A Geological Fairy Story

by DR. W. B. S. THOMAS, LYONS, N. J.

EVEN BEFORE once upon a time (and that indeed is a very long time, in fact a matter of millions and millions of years ago), there were mountains in the east of this continent. They were four times as high as the mountains there now—even higher than that. They were even higher than the Rocky Mountains ever were. Mount Washington in New Hampshire is a pygmy beside those giants of "before once-upon-a-time."

Isn't it really too bad there were no people then to see these wonderful mountains, or even to give them a name?

Several of these great peaks stood around a certain valley which, too, was nameless. There was snow on the mountains, and in the valley flowed a nameless stream. It was only a small stream as it flowed west toward an inland ocean that covered what is now Kentucky and Tennessee. Today we find sea shells and the remains of lobster-like creatures in the region of this warm inland sea. They lived in its waters millions of years before the Mississippi River was born to drain away this sea.

Days dawned and nights settled down upon these tremendous mountains, just as they do today on the Appalachians, their puny remnants, and the seasons came and went. There were storms and bright days, but there was no one to see them. Neither was there anyone to complain of weather.

Through it all the fast, tumbling, clear little brook raced on its way toward what would some day be the Ohio river. It had no name then, but we can call it the "Washer."

High above it on the mountainsides around the meadowlike valley were small openings—the mouths of caves. In them

was a sight such as Aladdin's lamp never conjured up—great masses of brilliant, sparkling quartz crystals. Much deeper in the rock were tunnels and buried caves also lined with these mineral flower beds. Some of the crystals were slightly purple because, it is thought, a trace of manganese had been left by nature in the crystal silica. Today we would call them amethysts and value them as semi-precious gems.

Because Mother Nature had been so good to these mountains, we can call them the Crystal Cave mountains.

Centuries passed; the weather grew cold, then hot, then cold again. Water seeped into tiny cracks in the rocks of the mountains; it froze, and because water takes up more space when it freezes, it split the rocks. Gradually they crumbled into sand and earth. The rain washed this debris into the Washer, and down it went into the river that someday was to be the Ohio, and then on into the inland sea.

With this sandy stuff along went some strange looking pieces of rock, round and knobby and as big as an orange, or some as big as a man's head. They rolled down the muddy mountain slopes and into the Washer. Today many of them may be found piled up in old stone fences around corn fields and pastures. Now we call them "geodes" if hollow, and perhaps if solid "modules." If you will walk along a fence made of them and tap each one, you will find one occasionally that gives back a hollow sound to your hammer. When such a geode is sawed open, it is likely to be lined with glittering quartz crystals just like the ones that filled the bigger caves in the Crystal Cave mountains. Occasionally one will be found filled with clear, beautiful

topaz crystals. That is a gem material, too.

As time went on, the wind, the rain and the frost crumbled away the tops of the mountains, and the Washer was choked with geodes (and nodules), with boulders that were hard and boulders that were soft, and gradually the little stream carried the top of the mountains through the mountain meadow and down to the stream that men today would call the Ohio, and on to the sea.

One bright day, (there was no reporter there but we know it must have happened), all the rock above the crystal caves had been washed away. The glass-like crystals hung in the sun like gigantic chandeliers, tossing rainbows around and shooting the rays of the sun back at it. Around them the rock kept crumbling away and after centuries had gone by the sides of the Crystal Cave mountains, no longer high and mighty, were sprinkled and crusted with piles of crystals and geodes.

But such beauty cannot last forever, although the crystals were hard and did not contain fissures to admit the water that would freeze and shatter them. The earth and the mountains were no longer young. Far to the west, and cons of time later, the Rocky Mountains, too, would rise and then be broken down gradually, and the streams would carry topaz crystals into Texas, and hard sapphires and rubies into Montana.

Maybe gradually, maybe with one earth-shaking crash, the piles of crystals rolled down the side of the Crystal Cave mountains and broke into millions of pieces. The Washer, helped by the rain and the melting snow, patiently picked up this glittering treasure and washed it down—down to the inland ocean.

The crystals bumped each other and wore their edges smooth. They turned at last into clean, white sand and water clear pebbles. For centuries the Washer, never tiring, kept rolling them along; the rains and the snow washed and sorted them, and the sun bleached and dried them. All this was still before once-upon-a-time.

Then came man. Indians found the clean, white sand where the inland ocean, now

long since drained away, had tossed it high on some ancient beach. They built a fire to cook their food, and after the embers had cooled, they discovered perchance that the sand had melted into a shapeless, shining blob. Because the sand was so clean and white, they carried away some of it in their pouches to scour their animal hides and cooking utensils (pottery).

Finally it was once-upon-a-time, and the white man came. He found the place where the Indians had made their fire, and he saw and liked the clean, white sand. His samples of it presently brought other men, who built walls and roofed them, and built a factory where they melted the sand into window panes for frontier houses. Other men took the precious sand and made eyeglass lenses, and the lenses of cameras and binoculars. And with the binoculars, a man could stand on top of what time had left of the Crystal Cave mountains and look far along the deep, fertile valley through which the tireless Washer still hurries. There is not a finer or more beautiful sight along the entire Appalachians.

When I was a boy a man came to my father's house. He was on an odd errand. He wanted to buy our window panes. They were pretty rough, but new putty had made them tight, and we loved the beautiful soft, purple color that they had turned after years in the sun. The man offered to replace them with the clearest window glass.

My father laughed and asked: "Why, do you want them for the purple color? What makes it, anyhow?"

"A trace of manganese," was the reply. "To be honest with you, this glass came from the Crystal Cave mountains. The sun has turned it purple. We want it for making a certain tint of eyeglass. You have heard of Crookes' lens glass?"

And so they made a bargain, and my boyhood home got new window glass. Now such glass is artificially colored but into it still goes quartz from some other Crystal caves—perhaps from that aptly named place in Brazil—Bello Horizonte, or Beautiful Horizons.

A Trip For Kunzite

by PERNEL BARNETT



MEMBERS OF WHITTIER GEM AND MINERAL SOCIETY FINDING GEM-QUALITY KUNZITE AT REYNOLDS MINE, PALA, CALIFORNIA, DECEMBER, 1954.

RECENTLY it was the good fortune of the Whittier (California) Gem and Mineral Society to get permission to visit the Reynolds kunzite gem mine near Pala, California. This is one of the few places in the world where kunzite is known to occur.

Kunzite is a variety of spodumene, a lithium aluminum silicate. Usually kunzite is almost transparent, although it occurs in almost any color. We think of it as a pale lilac pink gem. It usually is in long needle-like crystals. Kunzite is difficult to facet because it has perfect cleavage.

As with many gem stones it forms in pegmatite dikes. Geologists tell us a pegmatite is the residue or last part of molten rock to solidify and was formed deep within the earth, then exposed by upheaval and erosion. To me a pegmatite looks like ordinary gray granite, except the individual grains are very large. Associated with kunzite are lepidolite, amblygonite, tourma-



IT TAKES CLOSE LOOKING!

line, beryl, etc. From my observations at the Reynolds mine, quartz crystals (some doubly terminated), mica, and a very low grade of black tourmaline were its most

common associates. It is found in pockets in the pegmatite, sometimes several hundred pounds of clear crystals in a pocket. When one hunts kunzite one hits it rich or one hits nothing but granite, "all or nothing."

Pala is about seventy-five miles southeast of Los Angeles and is some forty-five miles north and five miles east of San Diego. The Reynold's mine is about four miles from Pala and about one-half mile beyond the Ashley mine, another gem property. Pala (Spanish for shovel) is on a black top road and has about two dozen homes and a general store. It is in a small valley surrounded by steep mountains. There is little suitable farm land and less water for irrigation, and the native population has still less energy to use them, so it seems. This is a semi-arid country, but on the western slope of the coast range, so the air is moist. This was demonstrated quite forcibly the morning after our arrival. Everything was as wet as though we had had a rain during the night. (Fogs are not uncommon, which is quite different from Lead Pipe Springs and other Death Valley points where we go for agate.)

The land around Pala is largely Government Indian Reservation property and controlled by the Pala Indians. Anyone who hunts for rocks on Indian land must first get permission from the tribal secretary, then register and pay fifty cents per head. Mr. Reynolds and a few others own their land in fee simple, the same as any property owner.

This mine is on a steep hill, so from its foot where we parked our cars to the workings was a stiff climb, a vertical distance of about 450 feet. The hills are covered with scrub trees and brush from six to sixteen feet high and "thick as hair on a dog's back."

The owner had requested that we not go into the underground workings, but gave us permission to screen the dumps. We used screens of all kinds, sizes and shapes. Most of them had a mesh of $\frac{1}{4}$ inch but some had as much as $\frac{1}{2}$ inch open-

ings. The dumps are mostly fine material, so it worked quite well. As the ground was damp the larger mesh screen was better than the fine. Since kunzite sells by the gram or carat we picked up everything big enough to see. Several came away with an ounce or more of stones, a few of which were of faceting quality. Also a number of doubly terminated quartz crystals were found. The black tourmaline is not worth picking up because it is soft and brittle.

Picking out kunzite from the quartz and other gangue is painstaking, back-breaking work, consequently when night came we were all very tired. The gem rock, which is almost colorless, is difficult to see and at first seems similar to quartz. It makes one think of transparent asbestos. However, the cleavage lines betray it.

After the evening meal was disposed of we built a camp fire, formed a circle and told stories until time to "hit the hay." The next morning everyone was out bright and early for another try at the elusive kunzite; this was an opportunity most of us would not get again soon. In fact, to many this was their first try at anything more valuable than agate. To most rock-hounds a stone dug out of the ground by its owner is more to be desired than one purchased. Too, most of us go for the trip and the fellowship it engenders. Consequently we are doubly rewarded and elated when we make a good find, as many did on this trip.

RECOMMENDED READINGS

"The Story of a Fumerole," by Harry Zollars, July issue of *The Voice*. An exciting story of how 30 years ago several young men explored the black depths of a fumerole and discovered the mummified remains of an extinct giant sloth.

*

"The Pearl," by Dr. Glenn Black, June issue of *ELS Newsletter*. Beautiful pearls are produced by the fresh water mussel, Unio. Dr. Black discusses these pearls and cites evidences of how they were cherished by the early American Indians.

*

"Obsidian," by Rhoda Brock, July issue of *Rockbound Call*. This article describes the properties of obsidian, tells of its ancient and modern uses and gives the location of California's largest deposit.

Man o' War: Mosaic Exquisitus!

by DR. BEN HUR WILSON

NOT ALL of our great artists, by any means, lived centuries ago. We have in our days and even in our own midst many skilled craftsmen and artisans whose works will certainly endure as great masterpieces throughout the long ages to come.

Members of the Midwest Federation in attendance at the recent Detroit Convention were privileged to participate in the pre-

of three of the oldest types of craftsmanship, namely, lapidary, inlay and mosaic. It contains approximately 1,000 pieces.

While most mosaics are made of loosely fitting pieces of colored glass or tile held together by varying widths of cement or plaster and mounted in cement, this 30 by 24 inch portrait is made of pieces of precious and semi-precious stones cut out so



JOE AND BETTY PHETTEPLACE WITH THEIR MOSAIC OF "MAN OF WAR."

mier showing the exquisite mosaic, "Man o' War," which no doubt is the first precision-made inlaid mosaic of precious stones ever made in the United States. Words are inadequate to describe the thrill which they received and many returned time and time again for another view.

This very intricate piece of work, which is actually a color portrait of the famous race horse "Man o' War," is a combination

perfectly that they fit to look like a hand-painted picture.

Joe Phetteplace and his wife Betty, of the little village of Wauzeka in southwest Wisconsin, worked together in producing this accurate likeness of the famous horse. "If it had not been for my wife," Phetteplace said, "I could not have done such a nice job. She helped me greatly by giving her critical but constructive advice on the

appearance of the mosaic as it progressed.

"I took the head apart and started over five times, and started the shoulder from scratch seven times, and was quite discouraged now and then before getting the likeness I wanted," Phetteplace admitted.

This mosaic is unique in another way, too, he pointed out. It is unusual in that it is built entirely on a light weight piece of reinforced concrete. He would not reveal the secret he discovered of the way to build the mosaic picture on the already dried cement.

The stones used in this inlaid mosaic were all so hard that they had to be cut and shaped on carborundum and diamond cutters. No metal tools will even scratch the stone used. Some of the pieces are only the size of a pin head, but all pieces fit together as though they came from the same chunk originally.

Stones used and their origin are: cherry tigereye, Belgian Congo; blue tigereye, Belgian Congo; sard (reddish brown), Brazil; peristerite (white), Canada; datolite (white), Michigan; malachite (green), Belgian Congo; black jade, Wyoming; tremolite, green jade, Wyoming; monterey jade (light green), Monterey, California; white, coral pink jade, Porterville, California.

All the material used for this revolutionary mosaic was bought over a period of five years and cost well over \$1,000, Phetteplace revealed. Phetteplace said he put in many 12-hour days and figured he worked about 2,100 hours in all over the last eight months in completing the picture.

The Phetteplaces, not living within range of any active clubs, are both individual members of the Midwest Federation, and attend the annual conclaves regularly. They have previously made many exquisite pieces of inlaid work in "mother-of-pearl," but this is their first serious attempt at working "Pietre dure." Although it is quite costly to make, because only about one-eighth of the precious stones bought are usable, inlays of this type will last for hundreds of years.

Two other prize works of the Phetteplaces' are a three- by two-foot view of the 1933 Century of Progress Exposition which contains approximately 10,000 individual pieces, and the portrait of a small girl, both done entirely of inlaid pieces of mother-of-pearl. These have been judged by experts to be the finest work of its kind ever produced in the United States.

Rockhounds passing through or visiting in southwestern Wisconsin will do well to look up the village of Wauzeka on their road-map and call at the shop of Mr. and Mrs. Phetteplace. Here they will receive a warm welcome and at the same time have the privilege of seeing one of the most interesting and fascinating lapidary operations in progress imaginable.

In this shop is done what is perhaps the highest grade of expert inlay work in mother-of-pearl, to ornament the fingerboards and other parts of costly stringed musical instruments owned by the nation's musical celebrities. Incidentally, a visit to the nearby cities of Prairie du Chien, Wisconsin, and McGregor, Iowa, will reveal many places of great interest, and at the latter place may be found more than forty colors and shades of picture sands, from which were made many decades ago the famous picture bottles that are now irreplaceable and priceless. A few may yet be seen in McGregor.

"The Great Stone Face," by William Stockdale, July issue of *Ye Old Timers' Bulletin*. This interesting story about the Great Stone Face in the White Mountains of New Hampshire is presented in the form of an interview with the "Old Man of the Mountain."

ANSWERS GEIGER AND SCINTILLATOR QUESTIONS

Valuable information for uranium prospectors is now available free upon request from Precision Radiation Instruments, Inc., 4223 W. Jefferson Blvd., Los Angeles 16, California. The 20 page, pocket-size booklet "64 Questions and Answers on Geiger Counters and Scintillators" covers, in layman's terms, such subjects as: claim staking, government bonuses, assaying of radioactive ores, aerial and ground surveys for uranium, oil and gas fields, effect of weather on radiation, use of various types of instruments and many other interesting topics.

Collecting Shark's Teeth

by STELLA RANDOLPH

AT CHESAPEAKE BEACH, Randall Cliffs, Scientists' Cove, or other similar spots in their vicinity on the western shore of Chesapeake Bay, Maryland, you are likely to see on a summer day a number of people whose manner of walking along the shore may puzzle you. Bent over, looking intently at the sand, oblivious to all else, they sometimes dart down and scoop up something which they examine, then tuck away in their pockets, or into a bag or some other receptacle. Well! At least it cannot be seafood they are collecting, for they wouldn't risk the mess in their pockets!

If eventually curiosity overcomes your determination to mind your own business, and you approach one of these collectors to learn his secret, beware! You will very likely become one of them. Especially after you have seen some of their best specimens and heard the history of those teeth found along the shore, will you relinquish the pleasure of lolling upon the beach. You, too, will become an intent stroller, hands behind your back, shoulders bent forward, eyes cast down, looking, looking, looking. For tooth-hunting has a fascination.

So far as is known there has not been a shark in the Bay within our lifetime, although some tall tales may be heard upon occasion. Geologists tell us the sharks whose teeth so abundantly appear in this area date back to the Miocene period, a goodly many millions of years ago. The sharks of that day didn't trifle with their victims, apparently, for they had teeth pretty much all over the inside of their mouths, and all of them slanted inward, so once a victim was hooked there was slight chance of escape.

The teeth found are of all sizes and various shapes. There are long, sharp-pointed ones, ranging in size from an eighth of an inch to several inches in length. There are big, broad ones, inches long; there are microscopic ones, so small that a magnify-



CLIFF AND SHORE AT CHESAPEAKE BEACH, WHERE SHARK'S TEETH ARE FOUND.

ing glass is needed to determine that they really are teeth. Some teeth have several saw-tooth-like points on one edge.

Collectors differ as to the best way of getting specimens. Some depend on being quick of eye and hand, and scooping up their finds as the water washes the teeth ashore. The water is the greatest help, or hindrance as the case may be, to the collector. It washes the teeth from out the cliffs where they have been deposited these many years, and carries them out to sea, returning them with the tides and the waves.

Low-tide is probably the best time for a good search, for then it is possible to walk about the edges of slippery gray clay cliffs, looking like solid rock, that line the shore on that side of the Bay. The receding waters at low tide may tuck a nice big tooth

away behind one of the hummocks of clay which appear like boulders, or a fine specimen may be left in the hollow where lapping waves have washed out some of the softer clay. Often the fossils look so much like a stone or bit of clay that it is necessary to look sharply to distinguish them.

The bathing, boating, fishing and crabbing are excellent in Chesapeake Bay, but a more peaceful sport is shark's tooth

hunting. No special equipment is needed. Just roll up your jeans and wade in, or walk higher up along the beach if you prefer to keep dry. You will soon know the pride of having secured some fine specimens. (Our own family have several pounds of teeth collected over a period of a few years, just in case anyone finds himself suddenly in need of a new and substantial denture!).

Ancient Wings In The Rocks

by HENRY P. ZUIDEMA

MASS MIGRATIONS of butterflies provide dramatic proof of the abundance of the earth's insect life. The monarch, a regular fall migrant across the Great Lakes region, goes aloft in countless numbers on a thousand mile trek to the south. A Texas migration of snout butterflies was estimated at more than a million individuals passing per minute and continuing for 18 days along a front 250 miles wide.

Forty thousand cicadas may emerge from the ground beneath a single tree. One ant hill may contain 200,000 or more individuals.

Yet the paleontologist, searching the rocks for the remains of ancient life, may not come upon a single fossil insect of any kind in all his travels. He will recognize a fossil butterfly as a rarity in even our largest museums, and may reflect on this while recalling the vast time, some 100 millions of years, that butterflies and moths certainly have been on the earth.

There are in the Rockies several "grass-hopper glaciers," small ice fields upon which hordes of wind-swept locusts were trapped in the recent past. These insects now lie as thick masses in the slowly melting ice. In a few hundred years all trace of these will be lost. Of today's great locust swarms in North Africa perhaps not a single insect will leave a fossil record, a matter of slight interest, perhaps, to the farmer who has seen his crops disappear under his feet.

The answer is that Nature rarely provides a mode of entombment that insures the preservation of those frail creatures whose role in the long story of life on earth is no less important than that of the mighty beasts whose mineralized bones are museum attractions.

Estimates differ, but at least 700,000 species of living insects have been described from all parts of the world and these a mere fraction of the total. But the known fossil species number only some 13,000. About nine-tenths of these come from a mere dozen localities in the whole world.

These twelve localities represent a time range in insect history of some 250 million years, the coal-bearing rocks of the Pennsylvanian period containing the earliest unquestionable insects.

This still incomplete record holds the marvelous story of the specialization of insect pollinators for their activity among specific kinds of plants and the evident adaptations of plants that came to depend on these insects. In this long geologic story there may lie the solutions to such biologic problems as the extermination of great groups of higher animals, among them the native American horses.

It is, in all, a record of a group of eminently successful living things, now the most numerous on earth, which has adapted itself to almost every conceivable environment and which, as the pessimist may note, preceded man on this planet by millions

of years and may be the last to leave it.

Best known of fossil insect localities is the Baltic coast, with its fossil resin, or amber, in which the trapped insects are marvelously preserved. Another is Florissant, Colorado, where fossil insects are found in the shales that represent the sediments in an ancient lake.

A new locality where the writer has collected many splendidly preserved insects at intervals since 1947 is in the Montana Rockies. Here as we dig there comes to light a picture of the ancient life along the shores of a lake that existed some 20 million years ago.

As we split the rock we envisage the insects that gathered in nuptial flight and see in our mind's eye their winged enemies, solitary hunters preying on their vegetarian neighbors. All this amid groves of stately sequoias and meadows of flowering plants that thrived before the present Rockies crowned the horizon.

It was a time when sunsets all around the earth were made brilliant by vast clouds of volcanic dust rising to the upper atmosphere as fire-mountains in the Yellowstone and to the northwest spouted ash with awesome frequency. But if the even tenor of life was interrupted time and again in the ancient land of Montana, plant and animal life elsewhere lived in harmony with nature. Across the seas the Alps had not yet risen. A lowland with wide rivers and tropical growth gave southern Europe the aspect of the present valleys of the Amazon and the Orinoco.

The first hint of what awaited us in our Montana valley came when we were prospecting not for insects but for fossil mammals. We needed mammals as time-markers, for our specific task was to reconstruct the geologic events along the Continental Divide.

After much crawling on hands and knees along the arroyos that dissect the Montana foothills, we had the good luck to find the fossil bones of ancient horses. These horses, much smaller than modern species, already walked on one toe on each foot, with two

lateral toes well off the ground. They belonged to a horse tribe close to the genus *Merychippus*, which in other regions of the West has left its bones in rocks of the later part of the Miocene epoch, or some 12 to 15 million years ago.

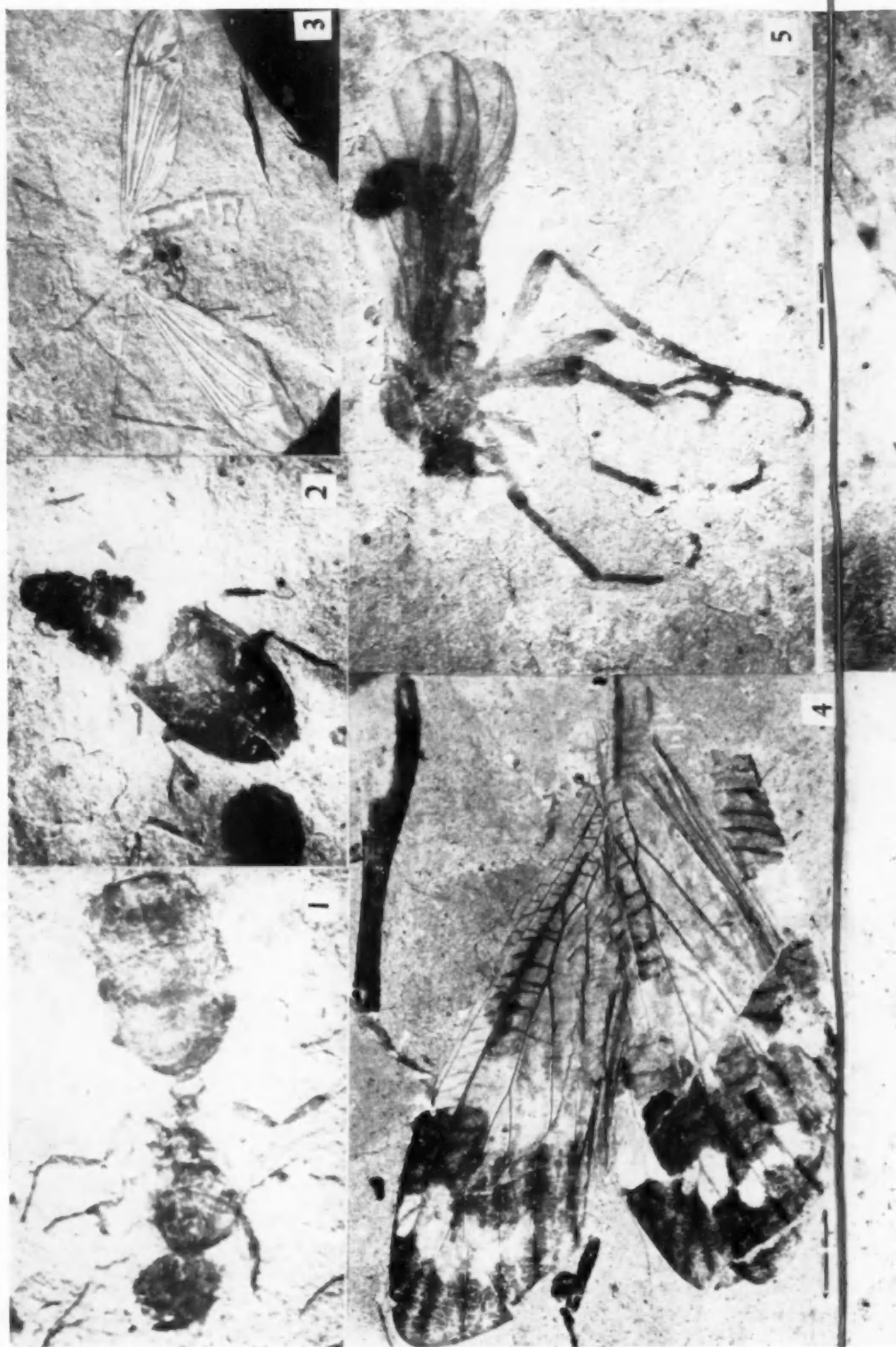
Lower in the rock sequence were shales, once fine sediments deposited in quiet waters and containing much volcanic ash. Such shales are ideal for the preservation and recovery of delicate organisms. White patches on the distant hills marked outcrops where these shales now are at the surface. Removal of a thin overburden of gravel, held together by the roots of greasewood and cactus, disclosed fresh layers of the shale, so fragile that when these dry on exposure they blow away like scraps of paper. Here was a rock that could be split into such thin layers with a knife blade that light actually passes through it.

Preserved on the face of a freshly split fragment of shale was a fossil crane fly measuring more than two inches between wing tips. The delicate vein pattern of the wings readily permitted identification as a member of the genus *Tipula*. This group today frequents the wet meadows and damp woods from South Carolina to Iowa and north to Newfoundland and Quebec. Crane flies are found near streams and ponds and we surmised that our specimen was pursuing similar habits when a gust of wind forced it down upon the sticky surface of a mud flat along the ancient lake.

The *Diptera* group, or flies, were well represented in the shale by midges, soldier flies, syrphids, binionids, and even a fossil gnat. At the end of the first season of digging the collection included 10 of the approximately 24 major groups of insects. The shales had given us grasshoppers, earwigs, plant hoppers, May fly nymphs, scorpion flies, click beetles, scarabs, wasps, ants, bees, alder flies and squash bugs.

Fossil fish scales could be identified as those of *Amia*, the bowfin, whose ancestry goes back far in geologic time and whose descendants still live in fresh waters in North America. As bowfins thrive today

Fossil Insects: 1. Ant (body length 11 mm). 2. Beetle. 3. Crane Fly, showing unusual preservation of wing structure and markings. 4. Wings of one of the *Sialidae* or Alder Flies; (Katydid femur at upper right). 5. Bibionid Fly. 6. Crane Fly, showing one of its pair of "halters" or balancing organs (below left wing). 7. Ichneumon Fly, a parasite of 20 million years ago. 8. Crane Fly. 9. Bibionid Fly. (Photography by author.)





in weedy, shallow waters, we seemed justified in projecting these conditions into the deep past. Frequent obstruction of streams by volcanic debris would have led to the forming of temporary, shallow lakes such as the one whose muds and silts preserved the insects. This explained the presence of the alder flies which lay their eggs in quiet waters, unlike their cousins, the dobson flies.

Gradually the picture of the ancient landscape unfolded for us. We were aided by frequent discoveries of fossil leaves, fruits, and occasional flowers. The finding of seeds of *Ailanthus*, the "tree of heaven," assured us that the tree was still thriving in this area in Miocene times. It was soon to become extinct in North America but it continued to live in Asia. Brought back to this continent about 1820, it was planted on Long Island and has continued to be "the tree that grows in Brooklyn"—as well as over much of the rest of our land.

Out of the shales came fossil willow, thorn apple, maple, rose, and a small fern-like plant similar to that which grows today in the shade of California's big trees. And there were leaves and stems of buckthorns, horsetails and an evergreen of the barberry family.

The needles and cones of the sequoias appeared often in the shales and with them fragments of *Metasequoia*, closely related to the California redwood and the southern swamp cypress. This tree was abundant and widely distributed in North America from the era of the dinosaurs to well into the succeeding time of the mammals. At the close of the Miocene these fine trees disappeared from this continent, held on for a time in Japan, and now consist of an isolated remnant, the "Dawn Redwood" of interior China. From this grove successful plantings have been made in the United States in recent years.

Thus the fossils provided a view into the deep past. We could reconstruct the area as a fairly well-watered region in a moderate climate where today, by contrast, the pronghorn antelope and jack rabbit

scamper among the sagebrush of a semi-arid land. Looking back through the millions of years with the help of our plant and insect fossils, we could see our small lake lying at an altitude of no more than 1,500 feet but with somewhat higher land nearby, as shown by the fossil pines in the shale.

Then the winds carried far-blown ash, thrown aloft by volcanic force. Slow elevation of the rocks raised the Rocky Mountain region. A gradual change occurred in the climate from warm and moist to cool and dry. All these changes altered the face of nature in the West. But for him who reads the rocks, the scene is not lost—even to the fall of a delicate winged creature which achieved an approach to immortality by ending its flight on a mud flat in Montana, long before man trod the earth.

COLLECTING TURQUOISE

by PERNEL BARNETT

ALTHOUGH TURQUOISE has been mined since prehistoric times, gem hunters, it seems, never get enough, so naturally our group at their earliest opportunity set out on a turquoise collecting trip. It has been traced from New Mexico into California and Nevada. The locality we chose in which to try our luck is about 18 miles east of Baker, en route to Las Vegas. At the



ENCAMPMENT OF THE TURQUOISE HUNTERS

Mobile Station we turned left until we reached the old road, then followed it about a half mile to the east; then we circled to the left into the hills about two miles farther. A left hand fork after the road starts to circle goes to a big mine, so pass it up. The hills about are pockmarked by the dumps of the early day turquoise miners.

Turquoise is opaque and gets its color from the copper it contains and has a hardness of 6. However, much of that found in the southwest is too soft to be of commercial value. From a deep blue or green it can be found in all shades until the color is barely discernible. Pieces as large as an English walnut of hard, pure turquoise,

in the country rock that by dint of much hard work with a pick and bar we were able to get out some nice pieces of turquoise. One moves a lot of barren rock for a few pieces of gem material, and there seems to be no way of telling where the next bunch will be found. One man may work for hours with nothing to reward him for his efforts, while the next person may find a real gem with little effort.

By close scrutiny of the ground surface, one party found bits of turquoise and eventually traced it to a pocket only a few inches under the surface. Who knows, some "Modern" may yet find a bonanza, at least that is what every rockhound hopes to do when he starts out on this kind of a trip.



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without a mixture, of matrix, are rare. The yellow or brownish matrix is about the same hardness as the turquoise and polishes well. Consequently much of the jewelry and display pieces contain matrix.

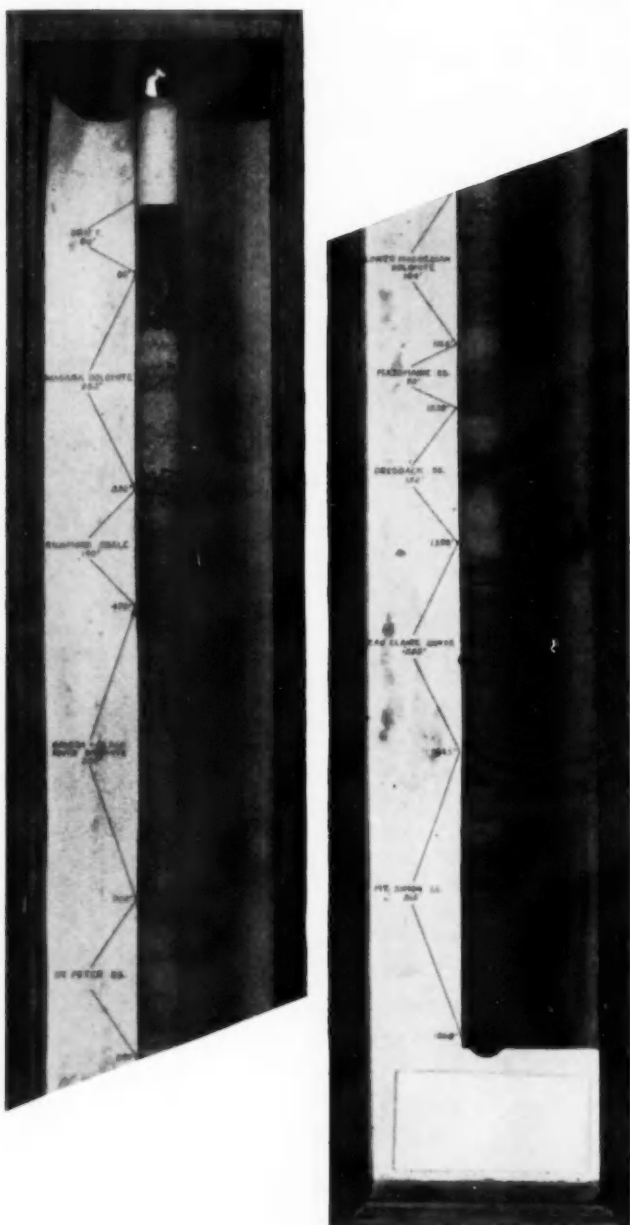
Someone rigged up a rope ladder so we could get into an old shaft that looked reasonably safe. One of the stopes was in excellent condition, even today, so with the aid of a good light we went to work. A chalky vein gave us a place to start with a heavy pick. There are enough fractures

LOOKING DOWN A DEEP WELL

by HIRAM L. KENNICOTT

A RECENT BIT of research was to look down our deep well here at The Grove which is 1960 ft. deep. The way we "looked" was at an exhibit in the pump-house and then by quizzing a friendly geologist. The exhibit is a tube with samples from the drilling at various depths. First 80 ft. of Drift (quoting our friend:

Niagara Dolomite ("dating back many hundreds of millions of years, laid down far from shore in the bed of the vast



being rich in minerals gives us one of the richest soils in the world here in the bread basket of the U.S.A."'). Next, 250 ft. of

ocean in this region in Silurian times, formed largely of debris of primitive invertebrate shell-life"). Then, 140 ft. of

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Richmond Shale ("thick beds of silty material from continents adjoining the ocean, compressed into shale that splits in layers."). Below that, 330 ft. of Galena-Black River Dolomite ("same as Niagara."). Next, 181 ft. of St. Peter Sandstone ("blown into the ocean during many millions of years from adjoining deserts."). Next 409 ft. ("no comments."). Then 255 ft. of Eau Claire Shale and Sandstone ("silt and sand in heterogeneous mixture, deposited during an unstable period when the shore line fluctuated."). Finally, 315 ft. of Mt. Simon Sandstone, ("formed early in the earth's history, when only the most primitive life, if any, existed."). The end, "Lake Superior level" water! . . . P. S., the geologist added: "At least seven times this area has been under the sea."

BIRTHSTONES, SEPTEMBER AND OCTOBER

by KENNETH PARKINSON, F.G.A.

SYMBOLISM in some form or another is seen in every walk of life, as typified by "Red for Danger," but hardly two writers agree on birthstone symbolism, as anyone will observe who studies the matter carefully, and the following is compiled from the most reliable existing records in an attempt to standardize the position as far as possible. On the grounds that it is a remnant of paganism, the majority of people emphatically deny that they are given to superstition, but from habit or secret belief, some little superstitious bug is hiding in most of us. Mainly from this point of view, the flowers and lucky charms ascribed to the various months are included. These have been taken from various lists compiled by "Authorities" who have written much on the subject and who believe in the influence of charms and jewels on the lives of those who wear them. The Talismanic gems of the various Guardian Angels are given for those who prefer them to the stones usually accredited to their particular month.

Sapphire is now the accepted birthstone for September, but until recent years, in some countries the Chrysolite and Topaz were favored. It is the gem of Libra (The Scales) September 23 to October 22. The Guardian Angel for September is Tsurriel, whose talismanic gem is Jacinth. The Special Apostle is Lebbeus Thaddeus. The flower is the Hop or the Aster. Lucky charms ascribed to this month are the Monkey, Cat, Spider, Parrot, Fox and Book. The Sapphire has always been considered a symbol of truth and affection, and possibly due to its extreme coldness it was held in high esteem for increasing and preserving the chastity of the wearer. It is not generally known that Sapphires may be found in all shades of color from very deep blue through green, brown and yellow, to quite colorless stones, but the beautiful soft cornflower-blue, is generally accepted as the most valuable and choicest color. It is surprising that the Star Sapphire is not credited with more symbolic influence apart from its virtues as a love charm and being in general very lucky. It is, however, the one stone which is said to exercise its good influence over its first wearer, even after it has been passed into other hands. It is a greyish blue color, displaying a beautiful white star of six points. Brown-eyed women are rather restricted where their special jewel colors are concerned, but fair haired and blue-eyed women have a wider choice and Sapphires are very kind to this type. Like the July Ruby, synthetic stones are very common and suspected stones should be submitted to a laboratory test. The term "Ceylon" Sapphire is used for pale stones, and "Kishmir" Sapphires represent the finest quality stones, while the prefix "Australian" is used for very dark and inferior gems. Montana Sapphires are those from the new mine in Montana. The Topaz, used as an alternative in earlier times, is the birthstone for November, and the Chrysolite is another name for Peridot, which is the alternative stone for August. The Jacinth of the Guardian Angel Tsurriel is an old misleading name given to several red

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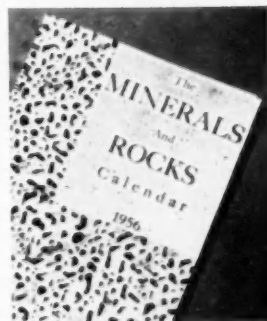
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stones and is now no longer used.

Opal is the accepted birthstone for October, although the Aquamarine was in favor until the 19th century. It is the gem of Scorpio (The Scorpion) October 23 to November 22. The Guardian Angel for October is Bariel, whose talismanic gem is Agate. The Special Apostle is Simon (Zelotes). The flowers are Clove, Hops and Carnation. Lucky charms ascribed to this month are Tiger, Hawk, Dog, Falcon, Ram, Wolf and Weasel. The Opal has been known for centuries and was considered by the Romans to be a lucky stone. The association which it has with bad luck appears to be based on a Teutonic superstition, amplified no doubt by Sir Walter Scott's novel "Anne of Gerstein," in which the Opal plays a prominent part, but even those with whom superstition holds sway believe it to be a lucky stone for those born in October. Really fine Opals are a rarity, but fairly good quality stones are to be seen every day, and to describe the beautiful, flashing colors in a few words does not do them justice. It is not generally known, however, that the variety known as "Fire Opal" is plain translucent red or orange in color and has not the wonderful display of colors seen in the better known Black Opal or White Opal. It is recorded that the Roman senator Nonius preferred exile rather than part with a brilliant Opal the size of a hazel nut, which was coveted by Mark Antony. Opals were well known as the favorite gems of Queen Victoria, but although considered by many as the most beautiful of precious stones, they are rather softer and more brittle than most gems, and in consequence have to be treated with great care or they will become scratched or chipped. The Aquamarine, used in earlier times, is the alternative stone for March, while the Agate of the Guardian Angel Bariel, is the birthstone for May.

HOLLYWOOD LAPIDARY AND MINERAL SOCIETY will have its eighth annual gem and mineral show on October 8-9, at Plummer Park Clubhouse, Los Angeles, Calif.

Midwest Club News

BERNICE WIENRANK, Club Editor

4717 North Winthrop Avenue
Chicago 40, Illinois

DETROIT CONVENTION

The 15th Annual Convention of the Midwest Federation was held in Detroit, June 23-25, with great success. The measure of this success was indicated in many ways. First, the Hotel Tuller management said that it was the kind of convention that could stand repeating, that it was inspirational, and that the beauty of the entire setup was surprising. Secondly, the dealers made oral and written comment that the organization was on par with professional. Thirdly, letters from non-members were warm with praise and, in certain cases, requested copies of the convention material as a guide for other groups. Finally, the Midwest members were happy with the way in which their displays were arranged—the cases, the illumination and the attractive setting of the Arabian Ballroom. They were enthusiastic about the outstanding program of lectures, and marveled at the truly wonderful collections of gems and minerals viewed on tours of the Cranbrook Museum and Wayne University.

The greater part of the credit for this excellent convention goes to the convention's host, the Michigan Mineralogical Society. The efficient management and advance planning by its committees under the leadership of John Mihelcic, general convention chairman, were responsible for the smooth running of the show and for the fine program presented.

The Midwest Federation presented a handsome trophy to the club with the most interesting display. The margin of victory was close, but the final tabulation of the judge's score sheets gave the nod to the Minnesota Mineral Club. The trophy will be its permanent reward for presenting an excellent all-around display. Each display by an individual or society received an exhibitor ribbon.

Rarely has there been seen a more beautiful display of a skilled selection of mineral specimens, of the cutting and polishing of gem stones, of jewelry creations, or of the applications and discoveries of the earth sciences, than that which came from near and far to the society exhibit section of the Arabian Ballroom.

The two turntables of faceted gems by the Michigan Lapidary Society were most effective and could well be used by others. The use of masonite pegboards, hinged together, to make a sphere display unit was another good thing that came out of the Twin Cities.

A different approach was used by Henry Zuidema. He displayed fossil insects embedded in amber, and alongside, enlarged photographs of them, revealing remarkable detail.

The magnificent mosaic of "Man of War," made by Betty and Joe Phetteplace, was in a class by itself. With more than 2,100 hours of

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CHANGE NOTICE

To all who have known us as
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We are pleased to announce a change in name and location. We bought out THE ORIGINAL CURIO STORE on the main street of downtown Santa Fe. (The oldest in the U.S.—Estab. in 1603.) Part of the Indian jewelry and old pots are being pushed aside to make room for our new PROSPECTORS SHOP where we will continue our old activities on a larger scale. Notices and new lists will go out to all our old friends shortly. Address inquiries to:



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work and \$1,000 worth of tiger eye, jade, peristerite and malachite, they completed a masterpiece that was reported all over the country by the Associated Press. Gloriously vivid, meticulously manipulated, it captured the imagination of all who saw it. Here was a project that called for the finest in a gem cutter. Far beyond the mechanics of facet or cabochon cutting, it was truly outstanding.

Adding much to the convention program, according to frequent comments, were the many fine lectures. Their wide range of subjects, to mention only a few, included geologic sights and finds in Michigan and Ohio, and the fossil patterns of that area; how to build a mineral collection; instruction in faceting and cabochon cutting; versatile techniques in polishing flats; asterism in stones; glaciation and various aspects of archaeology and paleontology, etc. Color photography and exemplary specimens richly pointed up the lectures.

At the business meeting seven new societies were admitted into the Federation, bringing to 42 the total membership. Plans were made to publish a new Midwest Federation Directory in 1956.

The following officers were elected for 1955-1956:

President: William Bingham, St. Paul, Minnesota.

Vice President: George Anderson, Minneapolis, Minnesota.

Secretary: Bernice Wienrank, Chicago, Illinois.

Treasurer: Orval Fether, Downers Grove, Illinois.

Historian: Dr. Ben Hur Wilson, Joliet, Illinois.

The Midwest Federation accepted the invitation of the Minnesota Mineral Club to hold its 1956 convention in the Twin Cities area (St. Paul and Minneapolis) and voted to invite the American Federation to hold its 1956 convention jointly with the Midwest Federation, with the Minnesota Mineral Club as co-host.

A banquet was held the final evening of the convention, followed by a colored movie of "The Land the Glacier Plowed" and a program of magic. Conventioneers were sorry to bid their old and new friends goodbye but looked forward to meeting again next year in the Twin Cities.

EVANSVILLE LAPIDARY SOCIETY recently toured Crystal Mine near Cave-In-Rock, Illinois. The group was invited to collect specimens at the mine, which produces fluorspar. Members obtained many beautiful, clear-blue crystals from the piles of mined spar. The geologic formations and the mining operations of the mine were explained to the visitors by Chester Shaw, geologist and mining consultant.

*

EARTH SCIENCE CLUB OF NORTHERN ILLINOIS has received a donation of about a ton of rock and mineral specimens from Helen Turner, Oak Park High School science instructor. The specimens are the surplus rock and minerals that Miss Turner has accumulated during the last 30 years.

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U. S. GEOLOGICAL SURVEY BULLETINS, other publications, back numbers bought and sold. Also files of periodicals. J. S. CANNER & Co., Inc., Boston 19, Mass.

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TEMPSKYA, eyed or curly, slabs, buds and masses. Write for price list. See you in Yakima, Sept. 2, 3 & 4, Booth 1 & 2. ART'S AGATE SHOP, 2820 "D" St., Baker, Oregon.

FLORIDA SHOP CLOSED. Talking, trading, traveling trip via Western States. Florida agate geodes and tumbled. Home Dec. 1. ORLA & WILLARD OLSEN, Route 1, Box 337, New Port Richey, Fla.

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ESCONI, which has not had time to classify the collection yet, plans to use it for teaching its junior groups and for exhibits.

*

INDIANA GEOLOGY AND GEM SOCIETY traveled to Waldron, Indiana, on July 10, where the group collected fossils of corals, crinoids, cephalopods, gastropods, brachiopods and a few trilobites. The hunt was preceded by a picnic lunch.

*

GEOLOGICAL SOCIETY OF MINNESOTA planned a field trip to Lake Minnetonka on August 21, to study its geology under the leadership of Adolph Meyer, eminent hydraulic engineer. During the drought years of the late '20s and early '30s, after the lake level had fallen seriously, Mr. Meyer assumed charge of the project to restore the lake level by pumping from deep wells. He was expected to give details of that engineering job.

*

ROCK AND RILL CLUB recently made a field trip to the Stainbrook farm near Milltown, South Dakota, where the group found quite a number of shark's teeth. A couple of years ago RR&C picked up about 300 at this same site, but they are not as plentiful now. A good rain, to produce more erosion of the area, should uncover an abundance.

*

CENTRAL IOWA MINERAL SOCIETY and the **NEBRASKA MINERAL AND GEM CLUB** held a joint picnic on June 12 at Adel, Iowa. At a nearby quarry they collected many fine pyrite nodules and some beautiful pyritized shells. After the picnic they viewed the famous gem, mineral and fossil collections of Hal Straight.

*

NEWS OF OTHER SOCIETIES

EL PASO MINERAL AND GEM SOCIETY announces that the fantastic rockhound stories of Agate Pete will be published soon in a 100-page booklet. The Agate Peter stories have appeared for several years in the society's bulletin, *The Voice*, and are the creations of its editor Harry Zollars. The rockhounds' own brand of science-fiction, they have often been reprinted by other magazines. The publishers plan to put this booklet, which will also include various poems written by Zollars, on the market at a price of one dollar per copy; they will be ready to make delivery sometime in August. Copies may be ordered from General Letter Service, 1800 Yandell Blvd., El Paso, Texas.

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MONTEBELLO MINERAL AND LAPIDARY SOCIETY's theme for its forthcoming Gem and Mineral Show, to be held November 5-6 at Moose Lodge Hall, 113 South 22nd St., Montebello, California, is "The Friendly Hobby." Visitors are cordially invited.

SAN DIEGO LAPIDARY SOCIETY in its June bulletin printed the following comment from a member who had recently returned from a fruitless rock-hunt in Michigan:

"After a month in Michigan, nary a mention of rocks or minerals did I hear. One Detroit newspaper carried an item about a man who had collected for years and he noted the fact that the only gem stones or minerals in Michigan were agates."

Actually, Michigan is well supplied with minerals, including agates, jasper, garnet, alabaster, copper, iron and halite. (See: "Collecting Michigan Minerals," by John Mihelcic, July-August, 1954, issue of EARTH SCIENCE.)

To avoid such disappointment when prospecting in unfamiliar areas, contact a rockhound of that locality for guidance, and/or take along a map of the region, which locates and describes its mineral deposits. If you plan to make a trip to the Midwest and would like to collect its native minerals, write the editor of this department for the names of persons interested in gems and minerals who reside in or near the places you intend to visit. Maps, charts, survey reports, etc., dealing with mineral deposits in the United States may be obtained from the

National Geologic Survey. Write to the Director, National Geologic Survey, Washington 25, District of Columbia, for a catalogue.

MINERALOGICAL SOCIETY OF PENNSYLVANIA recently made a field trip to Plum Point, Pennsylvania, to collect fossil fauna of the middle Miocene period. Here the group picked up shark's teeth and gastropods. Later at Cove Point, Pennsylvania, it collected black sand containing titanium and its associated mineral zircon. The latter fluoresces a bright orange.

SAN ANTONIO ROCK AND MINERAL SOCIETY recently attended a rockhound-roundup at the Woodward ranch, Alpine, Texas. Each member was given the first five pounds of agate that he found on the ranch. A small charge was made for additional material. A ten-pound chunk of red plume agate was found by Calvin Mansell. The hunt was followed by a barbecue.

BENICIA ROCK AND GEM CLUB on July 1 heard J. Lewis Renton, president of the American Federation of Mineralogical Societies, speak on "Gems and Minerals." Mr. Renton supplemented his talk with colored slides of his gem and mineral collection, which was featured at the New York World's Fair.

COLORADO MINERAL SOCIETY was scheduled to visit Castlewood Dam, just south of Franktown, Colorado, on July 31. This area contains some very fine petrified wood with agate centers.

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